

Application No.: 09/930,958

Docket No.: M4065.0151/P151-B

REMARKS

This application has been carefully reviewed in light of the Advisory Action mailed on June 6, 2003. Claim 55 has been amended. A marked-up version of this claim, showing changes made, is attached hereto as Appendix A. Please reconsider the above-referenced application in light of the May 21, 2003 amendments and remarks and this Supplemental Amendment and its following remarks.

A Request for Continued Examination and Petition for Extension of Time (one-month) is concurrently filed herewith.

The Advisory Action asserts that Okutoh I teaches "in figure 16 . . . a memory cell having a non-oxide layer 230 comprising platinum material on top of the platinum-rhodium layer 229." (Advisory Action, pg. 2).

Okutoh I fails to teach or suggest the limitations of claim 55. In particular, Okutoh I does not teach or suggest "a non-oxide layer comprising platinum material formed on top and in contact with the platinum-rhodium layer," as recited in claim 55 (emphasis added).

Okutoh I teaches that a PtRhOx film 229 is formed on top and in contact with the PtRh film. In Fig. 16, Okutoh I teaches that the lower electrode consists of "a lowermost-layer electrode 228 consisting of the PtRh film, an intermediate-layer lower electrode 229 consisting of the PtRhOx film, and an uppermost-layer lower electrode 230 consisting of the Pt film." (Col. 28, lines 42-45). Okutoh I does not teach or suggest that a non-oxide layer comprising platinum is formed on top and in contact with the platinum-rhodium layer.

Claims 57 and 58 depend from and incorporates all of the limitations found in independent claim 55 and are at least allowable for the reasons set forth above with regard to claim 55.

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The Advisory Action asserts that Okutoh II teaches "a memory cell having a non-oxide layer comprising platinum material 22 on top of the platinum-rhodium layer." (Advisory Action, pg. 2).

Okutoh II fails to teach or suggest the limitations of claim 55. In particular, Okutoh II does not teach or suggest "a non-oxide layer comprising platinum material formed on top and in contact with the platinum-rhodium layer," as recited in claim 55 (emphasis added).

Okutoh II teaches that an oxide film 21 is formed on top and in contact with the PtRh film 20. In Fig. 8, Okutoh II teaches a capacitor lower electrode with "an alloy film 20 of platinum and rhodium . . . [and] an alloy oxide film 21 of platinum and rhodium" formed on top of the platinum-rhodium film 20 (Col. 8, lines 32-35). Okutoh II does not teach or suggest that a non-oxide layer comprising platinum is formed on top and in contact with the platinum-rhodium layer.

Claims 57 and 58 depend from and incorporates all of the limitations found in independent claim 55 and are at least allowable for the reasons set forth above with regard to claim 55.

The Advisory Action asserts that Okutoh II teaches a titanium layer 8 beneath the platinum-rhodium layer and relies upon Dornfest for teaching a titanium nitride layer. The Advisory Action concludes that "the equivalence of the diffusion barrier layer such as titanium nitride layer or titanium aluminum nitride layer can be used in place of titanium layer in order to prevent silicon in the substrate from diffusing through the electrode." (Advisory Action, pg. 2). Applicants respectfully disagree.

Okutoh II provides a first titanium nitride film 16 "that serves as an adhesion layer and an antireflection film," (FIG. 8 and Col. 5, lines 23-25). Okutoh II also teaches a second "titanium nitride film 9 of a diffusion barrier layer," (FIG. 1 and Col. 5, lines 14-15).

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There is no motivation to combine the cited references. In FIG. 1, Okutoh II illustrates a titanium layer 8 formed beneath the titanium nitride layer 9. As a result, Okutoh II only teaches or suggests forming a titanium nitride layer 9 on top of a titanium layer 8 and does not teach or suggest substituting the titanium layer with a titanium nitride layer as the Advisory Action asserts.

Accordingly, the cited references do not teach or suggest, "a capacitor comprising an electrode having a titanium nitride layer provided beneath a platinum-rhodium layer and a platinum layer on top of the platinum-rhodium layer," as recited in claim 125.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue.

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Respectfully submitted,

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APPENDIX A

55. (twice amended) A memory cell, comprising:

a substrate;

a transistor including a gate on said substrate and a source/drain region in said substrate disposed adjacent to said gate;

a capacitor comprising an electrode having a layer [comprising titanium beneath a layer] comprising platinum-rhodium material and a non-oxide layer comprising platinum material formed on top [of] and in contact with the platinum-rhodium layer, wherein the electrode has a lateral surface aligned with the source/drain region; and

a conductive plug providing electrical contact between the source/drain region and the lateral surface of the electrode.